group [as an adhesion group bonded to a polymer side chain], and an acid generator for generating an acid through irradiation with light;

irradiating said resist film with extreme UV of a wavelength of a 1 nm through 30 nm band for pattern exposure; and

A, cont.

forming a resist pattern from an unexposed portion of said resist film by developing said resist film after the pattern exposure.

REMARKS

I. Introduction

In response to the pending Office Action, Applicants have amended claim 1. No new matter has been added. For the reasons set forth below, Applicants respectfully submit that the pending claims are patentable over the cited prior art reference.

II. The Rejection Of Claims 1-9 Under 35 U.S.C. § 102

Claims 1-9 were rejected under 35 U.S.C. § 102 as being anticipated by USP No. 6,103,447 to Chen. Applicants respectfully traverse this rejection for the following reasons.

A. Claim 1

One of the novel aspects of the present invention as recited by claim 1 resides in forming a resist film which includes a base polymer having a lactone group and having ***neither*** a hydroxyl group nor a carboxylic group. As detailed in the specification, by the

use of the claimed base layer, the exposed portion of the resist film can be definitely resolved in an alkaline developer even if the resist was exposed utilizing extreme UV.

In contrast to the present invention, and contrary to the conclusion set forth in the pending rejection, Chen discloses the utilization of a base polymer having a lactone group, and at least one of hydroxyl group and carboxylic group.

More specifically, in the pending rejection it is asserted that Chen discloses a base polymer having neither a hydroxyl group nor a carboxylic group. However, it is respectfully submitted that this conclusion is incorrect. Referring to col. 3, lines 15-25 thereof, Chen teaches the use of "a positive-tone resist which comprises a blend of at least two miscible aqueous base soluble polymer resist". For the polymer to be water-soluble, it is necessary to have a hydroxyl group in the end portion of either the side chain or the functional group of the base polymer. A base polymer is not water-soluble if the base polymer has no hydroxyl group. Thus, Chen does not disclose a resist having a base polymer having a lactone group and having neither a hydroxyl group nor a carboxylic group.

Indeed, the method of Chen would appear to suffer from the problems solved by the present invention. Specifically, when practicing Chen, excitation of the hydroxyl group occurs in the exposed portion of the resist film subjected to the pattern exposure using the extreme UV, and thereby generates radicals. As a result, a crosslinking reaction is caused within the base polymer and between polymers, and dissolving of the exposed portion of the resist film in an alkaline developer becomes significantly difficult.

As anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single

prior art reference, ***Kalman v. Kimberly-Clark Corp.***, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983), for at least the foregoing reasons, it is clear that Chen does not anticipate claim 1, or any claim dependent thereon.

B. Claim 6

Turning to claim 6, one of the novel aspects of the present invention as recited by claim 6 resides in a chemically amplified resist material that includes in-part a base polymer ***and*** an aromatic compound that does not generate an acid through irradiation with light. As explained in more detail in the specification, although radicals concerned with the crosslinking reaction are generated through the extreme UV irradiation in the exposed portion of the resist film, the radicals are captured by the aromatic compound, and the captured radicals are not diverted to acid generation. Accordingly, the number of radicals generated from the base polymer and concerned with the crosslinking reaction are reduced, and therefore, the crosslinking reaction is minimized such that the exposed portion of the resist film can be definitely dissolved in an alkaline developer. As a result, the resist pattern can be formed in the desired pattern.

In contrast, although the resist material in Chen includes hydroxystyrenes, methacrylates or the like, they (hydroxystyrenes, methacrylates or the like) are included in the base polymer of the resist material (*see*, col. 3, lines 51-60 of Chen, which states "polymers are selected from the group consisting of hydroxystyrenes ... methacrylates," and col. 9, lines 26-30 of Chen, which states "copolymer consisting of 65 mole % hydroxystyrenes and ..."). Thus, at a minimum, the resist material in Chen does not

include the claimed aromatic compound that does not generate an acid through irradiation with light as recited by claim 6.

Once again, as anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, ***Kalman v. Kimberly-Clark Corp.***, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983), for at least the foregoing reasons, it is clear that Chen does not anticipate claim 6, or any claim dependent thereon.

III. All Dependent Claims Are Allowable Because The Independent Claims From Which They Depend Are Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, ***Hartness International Inc. v. Simplimatic Engineering Co.***, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claims 1 and 6 are patentable for the reasons set forth above, it is respectfully submitted that all dependent claims are also in condition for allowance.

IV. Request For Notice Of Allowance

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited.

If there are any outstanding issues that might be resolved by an interview or an

Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

Attached hereto is a clean version of the claims by the current amendment. The attached page is captioned "**APPENDIX**."

Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that Applicant has inadvertently overlooked the need for a petition for extension of time. The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-0417.

Respectfully submitted,

McDERMOTT, WILL & EMERY

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APPENDIX

Claim 1 has been amended to read as follows:

1. (Amended) A pattern formation method comprising the steps of:

forming a resist film of a chemically amplified resist material including a base polymer having a lactone group and having neither a hydroxyl group nor a carboxylic group, and an acid generator for generating an acid through irradiation with light;

irradiating said resist film with extreme UV of a wavelength of a 1 nm through 30 nm band for pattern exposure; and

forming a resist pattern from an unexposed portion of said resist film by developing said resist film after the pattern exposure.